CAT® Lift Trucks

Service Manual

MC/FC

Chassis, Mast & Options

GP40K	**ET29C-00011-up**	**DP40K**	**ET19C-00011-up**
GP40KL	**ET29C-50001-up**	**DP40KL**	**ET19C-50001-up**
GP45K	**ET29C-80001-up**	**DP45K**	**ET19C-80001-up**
GP50K	**ET33B-50001-up**	**DP50K**	**ET28B-50001-up**

For use with S6S and TB45 Engine Service Manual. **99739-65120**

FOREWORD

This service manual is a guide for servicing Cat® lift trucks. For your convenience the instructions are grouped by systems as a ready reference.

The long productive life of your lift truck(s) depends on regular and proper servicing—servicing consistent with what you will learn by reading this service manual. Read the respective sections of this manual carefully and familiarize yourself with all of the components before attempting to start a test, repair or rebuild job.

The descriptions, illustrations and specifications contained in this manual are for trucks with serial numbers in effect at the time of printing. Cat Lift Trucks reserves the right to change specifications or design without notice and without incurring obligation.

GP40K, GP40KL, GP45K, and GP50K are powered by TB45 gasoline engine.
DP40K, DP40KL, DP45K, and DP50K are powered by S6S diesel engine.

Safety Related Signs

The following safety related signs are used in this service manual to emphasize important and critical instructions:

⚠ WARNING — Indicates a specific potential hazard resulting in serious bodily injury or death.

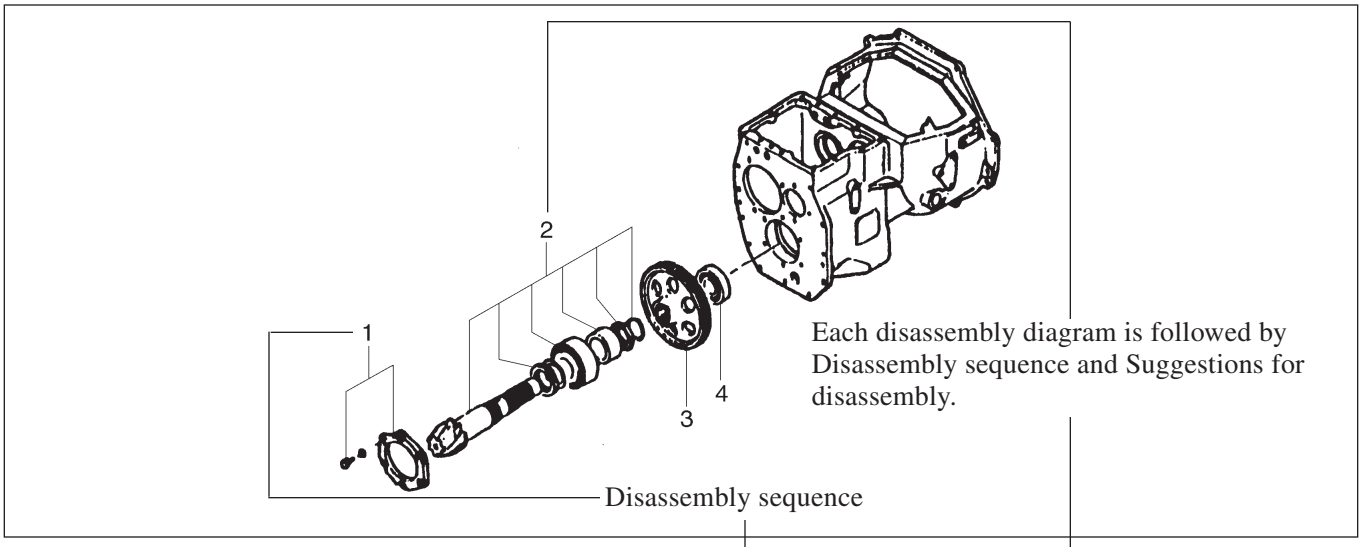
⚠ CAUTION — Indicates a specific potential hazard resulting in bodily injury, or damage to, or destruction of, the machine.

NOTE — Indicates a condition that can cause damage to, or shorten service life of, the machine.

Pub. No. 99739-65120

HOW TO READ THIS MANUAL

Disassembly diagram (example)

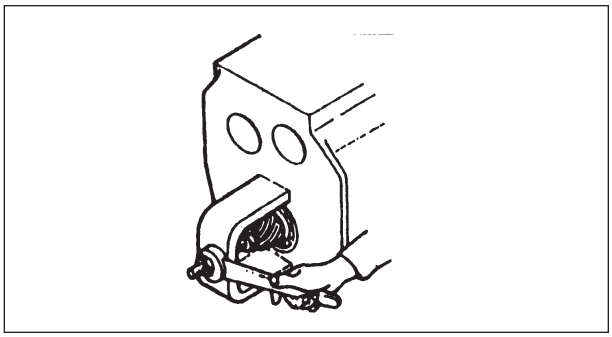


Sequence

1. Cover, Bolt, Washer (part name)
2. Output shaft (part name)

Suggestion for disassembly

(1) Output shaft removal



Unit: mm (in.)

Clearance between cylinder and piston	A	0.020 to 0.105 (0.00079 to 0.00413)
	B	0.15 (0.0059)

A: Standard value B: Repair or service limit

Symbols or abbreviations

OP .....Option

R1/4.....Taper pipe thread (external) 1/4 inch (formerly PT1/4)

Rc1/8.....Taper pipe thread (internal) 1/8 inch (formerly PT1/8)

G1/4A.....Straight pipe thread (external) 1/4 inch (formerly PF1/4-A)

Rp1/8.....Straight pipe thread (internal) 1/8 inch (formerly PS1/8)

SAFETY

⚠ WARNING

The proper and safe lubrication and maintenance for this lift truck, recommended by Cat Lift Trucks, are outlined in the OPERATION & MAINTENANCE MANUAL for these trucks.

Improper performance of lubrication or maintenance procedures is dangerous and could result in injury or death. Read and understand the OPERATION & MAINTENANCE MANUAL before performing any lubrication or maintenance.

The serviceman or mechanic may be unfamiliar with many of the systems on this truck. This makes it important to use caution when performing service work. A knowledge of the system and/or components is important before the removal or disassembly of any component.

Because of the size of some of the truck components, the serviceman or mechanic should check the weights noted in this Manual. Use proper lifting procedures when removing any components.

Following is a list of basic precautions that should always be observed.

1. Read and understand all warning plates and decals on the truck before operating, lubricating or repairing the product.
2. Always wear protective glasses and protective shoes when working around trucks. In particular, wear protective glasses when pounding on any part of the truck or its attachments with a hammer or sledge. Use welders gloves, hood/goggles, apron and other protective clothing appropriate to the welding job being performed. Do not wear loose-fitting or torn clothing. Remove all rings from fingers when working on machinery.
3. Do not work on any truck that is supported only by lift jacks or a hoist. Always use blocks or jack stands to support the truck before performing any disassembly.

⚠ WARNING

Do not operate this truck before you read and understand the instructions in the OPERATION & MAINTENANCE MANUAL. Improper truck operation is dangerous and could result in injury or death.

4. Lower the forks or other implements to the ground before performing any work on the truck. If this cannot be done, make sure the forks or other implements are blocked correctly to prevent them from dropping unexpectedly.
5. Use steps and grab handles (if applicable) when mounting or dismounting a truck. Clean any mud or debris from steps, walkways or work platforms before using. Always face truck when using steps, ladders and walkways. When it is not possible to use the designed access system, provide ladders, scaffolds, or work platforms to perform safe repair operations.
6. To avoid back injury, use a hoist when lifting components which weigh 23 kg (50 lb.) or more. Make sure all chains, hooks, slings, etc., are in good condition and are of the correct capacity. Be sure hooks are positioned correctly. Lifting eyes are not to be side loaded during a lifting operation.
7. To avoid burns, be alert for hot parts on trucks which have just been stopped and hot fluids in lines, tubes and compartments.
8. Be careful when removing cover plates. Gradually back off the last two bolts or nuts located at opposite ends of the cover or device and pry cover loose to relieve any spring or other pressure, before removing the last two bolts or nuts completely.
9. Be careful when removing filler caps, breathers and plugs on the truck. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. The danger is even greater if the truck has just been stopped because fluids can be hot.

10. Always use tools that are in good condition and be sure you understand how to use them before performing any service work.
11. Reinstall all fasteners with same part number. Do not use a lesser quality fastener if replacements are necessary. Do not mix metric fasteners with standard nuts and bolts.
12. If possible, make all repairs with the truck parked on a level, hard surface. Block truck so it does not roll while working on or under truck.
13. Disconnect battery and discharge any capacitors (electric trucks) before starting to work on truck. Hang "Do not Operate" tag in the Operator's Compartment.
14. Repairs, which require welding, should be performed only with the benefit of the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures. Determine type of metal being welded and select correct welding procedure and electrodes, rods or wire to provide a weld metal strength equivalent at least to that of parent metal.
15. Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged nor will it be damaged in operation by contacting sharp corners, or by rubbing against some object or hot surface. Do not connect wiring to a line containing fluid.
16. Be sure all protective devices including guards and shields are properly installed and functioning correctly before starting a repair. If a guard or shield must be removed to perform the repair work, use extra caution.
17. Always support the mast and carriage to keep carriage or attachments raised when maintenance or repair work is performed, which requires the mast in the raised position.
18. Loose or damaged fuel, lubricant and hydraulic lines, tubes and hoses can cause fires. Do not bend or strike high pressure lines or install ones which have been bent or damaged. Inspect lines, tubes and hoses carefully. Do not check for leaks with your hands. Pin hole (very small) leaks can result in a high velocity oil stream that will be invisible close to the hose. This oil can penetrate the skin and cause personal injury. Use cardboard or paper to locate pin hole leaks.
19. Tighten connections to the correct torque. Make sure that all heat shields, clamps and guards are installed correctly to avoid excessive heat, vibration or rubbing against other parts during operation. Shields that protect against oil spray onto hot exhaust components in event of a line, tube or seal failure, must be installed correctly.
20. Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.
21. Do not operate a truck if any rotating part is damaged or contacts any other part during operation. Any high speed rotating component that has been damaged or altered should be checked for balance before reusing.

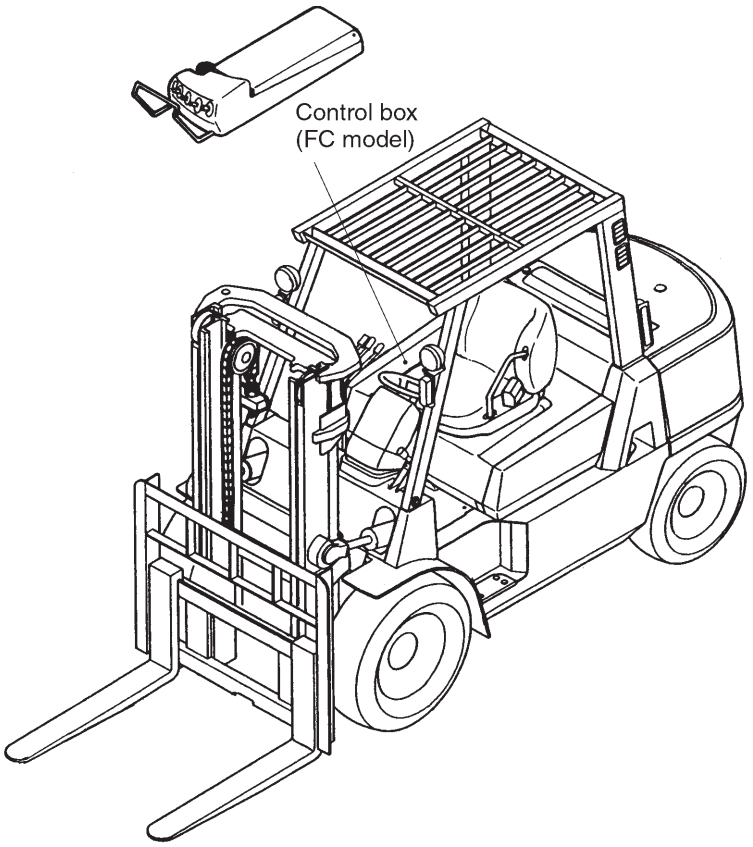
GROUP INDEX

GROUP INDEX	Items
GENERAL INFORMATION	Model View, Truck Models Covered, Serial Number Locations, Chassis and Mast Model Identification, Dimensions, Technical Data
COOLING SYSTEM	Structure, Removal and Installation, Inspection and Adjustment
ELECTRICAL SYSTEM	Structure and Functions, Disassembly and Reassembly, Major Electrical Components, Lamp Bulb Specifications, Battery Maintenance, FC (Finger-Tip-Control System), Troubleshooting, Electrical Schematics
POWER TRAIN	Removal and Installation
POWERSHIFT TRANSMISSIONS	1-Speed Transmission (GP40K, GP40KL, GP45K, DP40K, DP40KL, DP45K), Structure and Functions, Removal and Installation, Torque Converter, Transmission, Control Valve, Adjustment, Automatic 2-Speed Transmission (GP50K, DP50K), Transmission, Selector Valve, Adjustment, Troubleshooting, Service Data
FRONT AXLE AND REDUCTION DIFFERENTIAL	Structure and Function, Removal and Installation, Axle Shafts and Hubs, Reduction Differential, Troubleshooting, Service Data
REAR AXLE	Structure, Removal and Installation, Rear Axle Assembly, Steering Cylinder, Adjustment, Troubleshooting, Service Data
BRAKE SYSTEM	Structure and Functions, Master Cylinder, Wheel Cylinders, Wheel Brakes, Inspection and Adjustment, Troubleshooting, Service Data
STEERING SYSTEM	Structure and Functions, Removal and Installation, Steering Valve, Troubleshooting, Service Data
HYDRAULIC SYSTEM	Structure and Functions, Removal and Installation, Hydraulic Pump (Gear Pump), Lift Cylinders, Tilt Cylinders, Flow Regulator Valve, Down Safety Valve, Inspection and Adjustment, Testing, Troubleshooting, Service Data MC Control Valve, FC Control Valve
MASTS AND FORKS	Structure, Removal and Installation, Disassembly and Reassembly, Inspection and Adjustment, Troubleshooting, Service Data
SERVICE DATA	Tightening Torque for Standard Bolts and Nuts, Maintenance Schedule, Parts To Be Changed Periodically, Location of Periodic Replacement Parts, Lubrication Instructions, Special Tools
OPTIONS	Radiator Screen Kit, Radiator Plate-Fin Type Kit, Elevated Exhaust Kit, Anti-corrosion Radiator Kit, Front Axle Breather Kit, Pre-cleaner Kit, etc.

GENERAL INFORMATION

Model View ..... 1 – 1
Truck Models Covered ..... 1 – 1
Serial Number Locations ..... 1 – 2
Chassis and Mast Model Identification ..... 1 – 3
Dimensions ..... 1 – 4
Technical Data ..... 1 – 6

Model View



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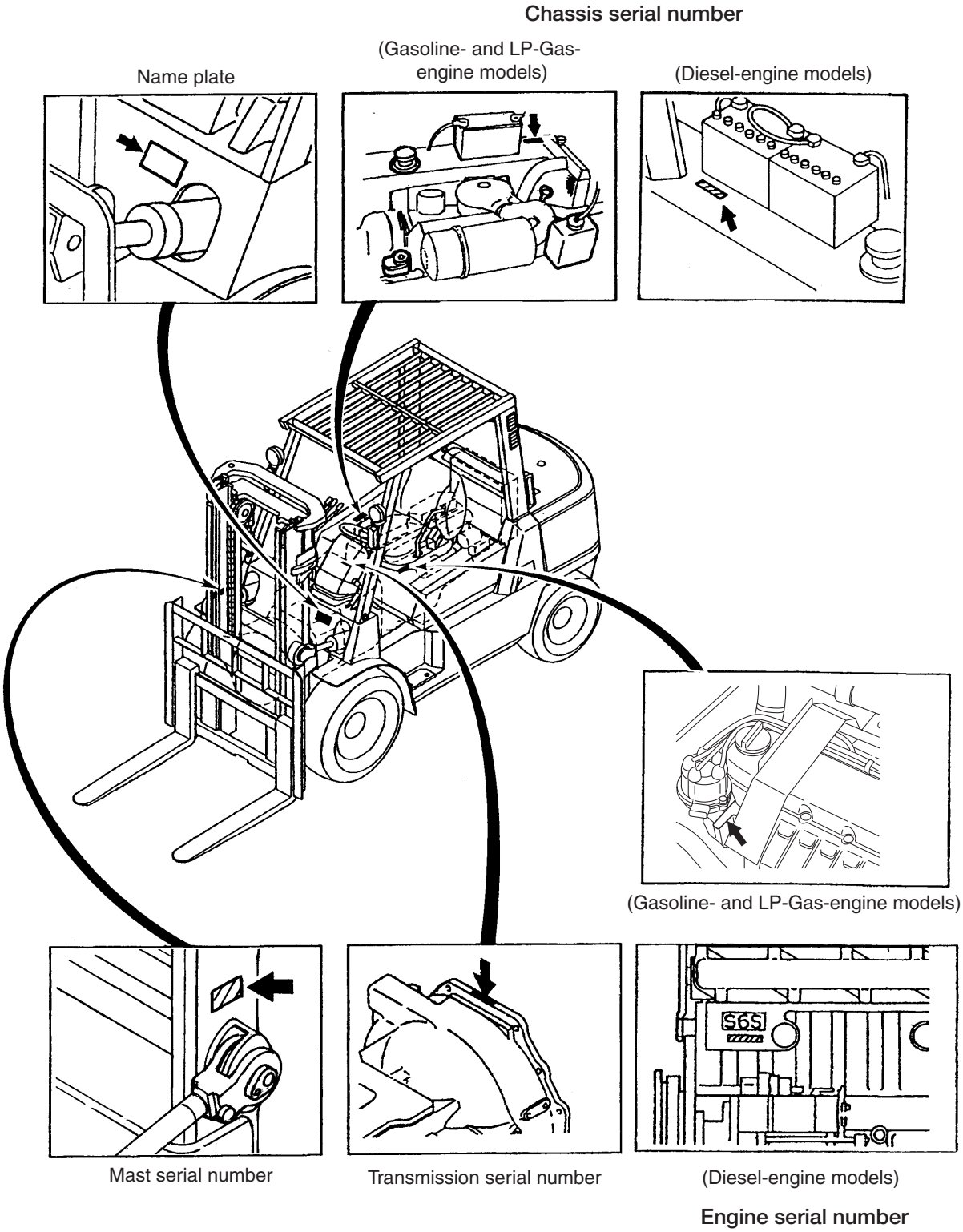
Truck Models Covered

This Service Manual furnishes servicing and maintenance information for the following trucks:

Truck model	Model code – Serial number	Engine mounted
GP40K	ET29C – 00011- up	TB45 gasoline engine
GP40KL	ET29C – 50001- up	TB45 gasoline engine
GP45K	ET29C – 80001- up	TB45 gasoline engine
GP50K	ET33B – 50001- up	TB45 gasoline engine
DP40K	ET19C – 00011- up	S6S diesel engine
DP40KL	ET19C – 50001- up	S6S diesel engine
DP45K	ET19C – 80001- up	S6S diesel engine
DP50K	ET28B – 50001- up	S6S diesel engine

Serial Number Locations



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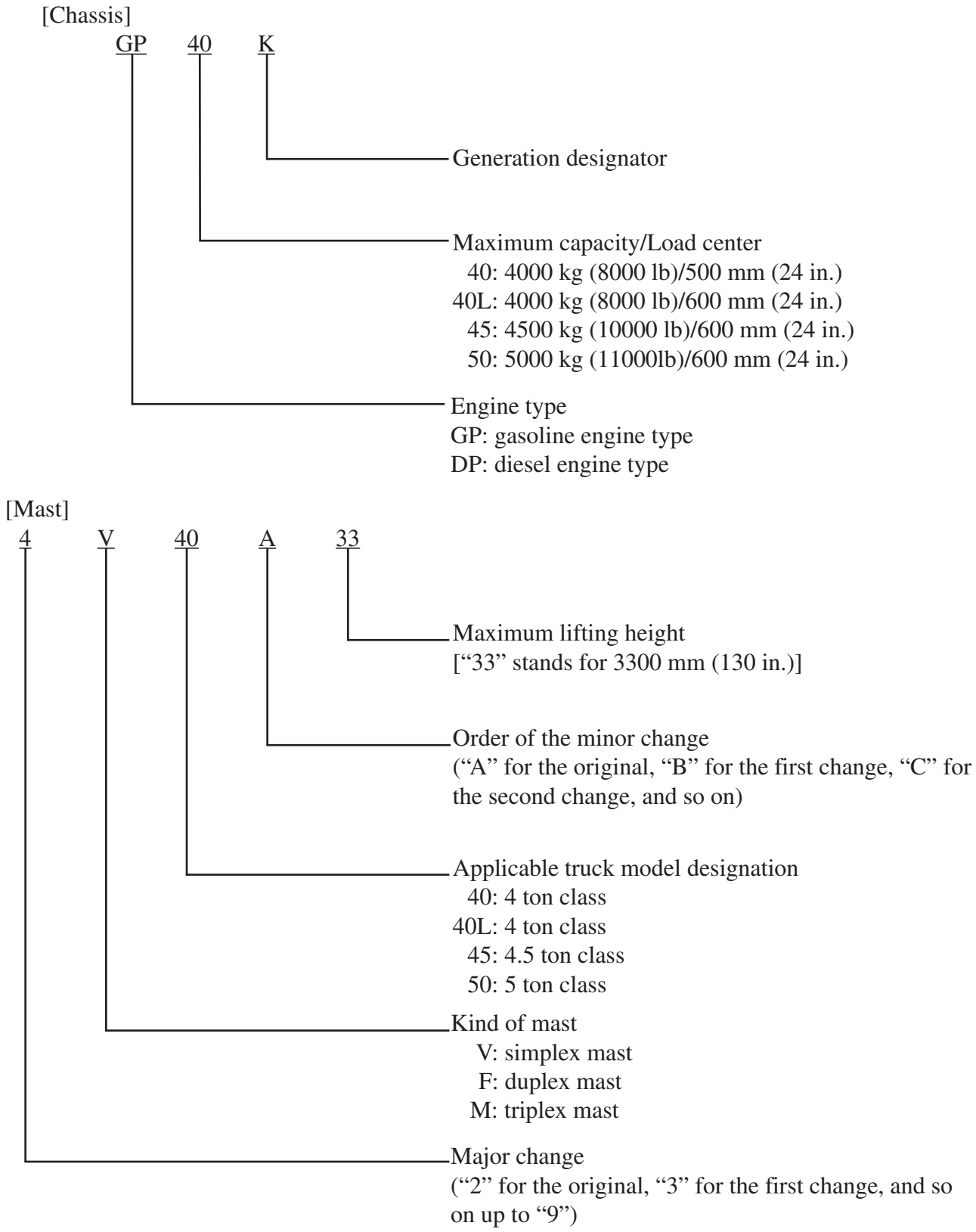
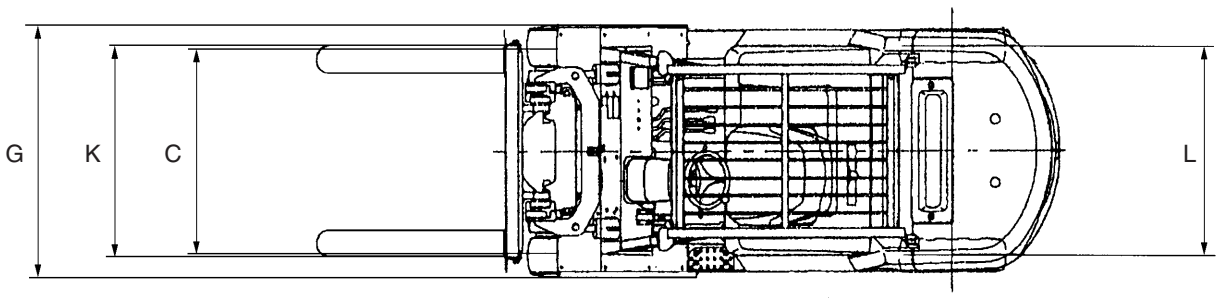
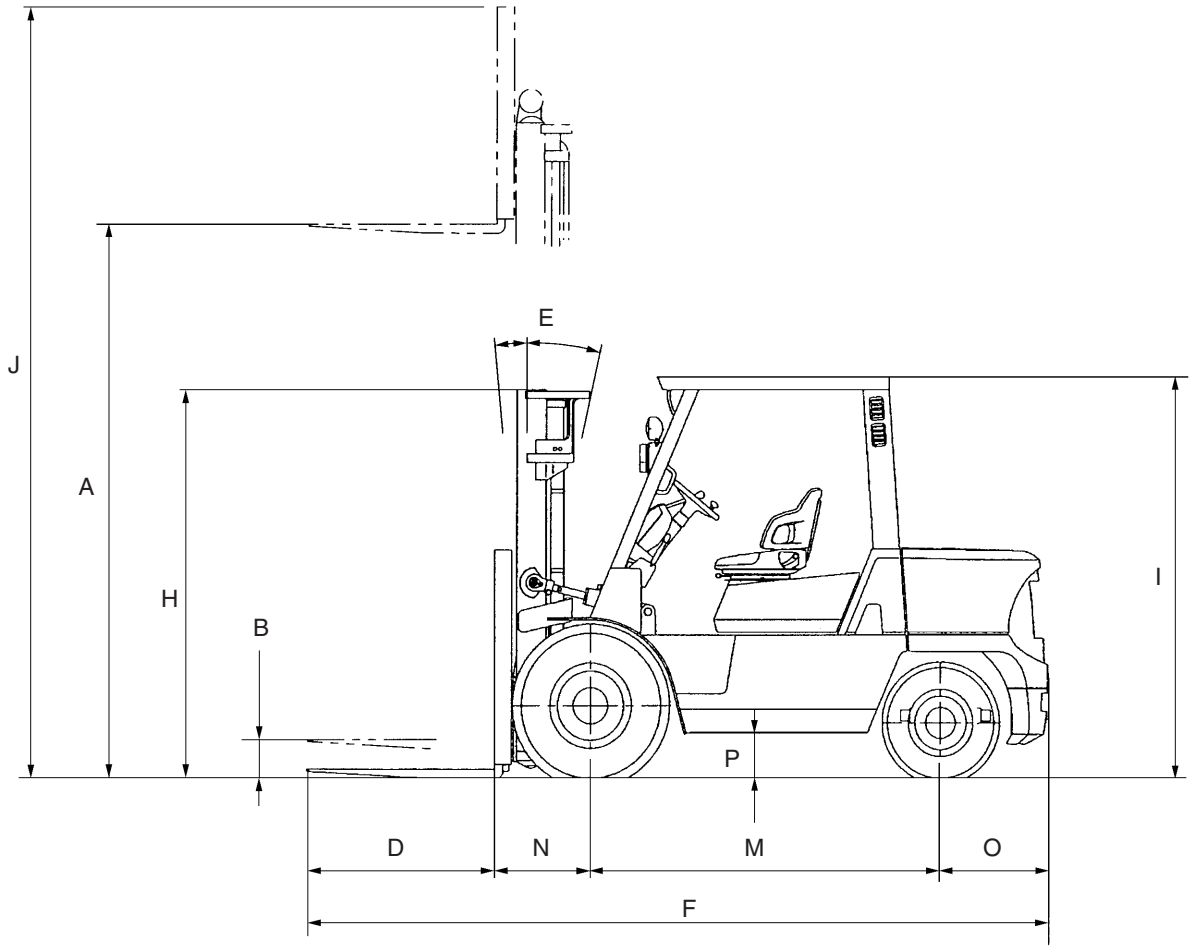
Chassis and Mast Model Identification


[Chassis]
GP 40 K
Generation designator
Maximum capacity/Load center
40: 4000 kg (8000 lb)/500 mm (24 in.)
40L: 4000 kg (8000 lb)/600 mm (24 in.)
45: 4500 kg (10000 lb)/600 mm (24 in.)
50: 5000 kg (11000lb)/600 mm (24 in.)
Engine type
GP: gasoline engine type
DP: diesel engine type
[Mast]
4 V 40 A 33
Maximum lifting height
["33" stands for 3300 mm (130 in.)]
Order of the minor change
("A" for the original, "B" for the first change, "C" for the second change, and so on)
Applicable truck model designation
40: 4 ton class
40L: 4 ton class
45: 4.5 ton class
50: 5 ton class
Kind of mast
V: simplex mast
F: duplex mast
M: triplex mast
Major change
("2" for the original, "3" for the first change, and so on up to "9")

Dimensions





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Unit: mm (in.)

Ref. No.	Item \ Truck Model		GP40K DP40K	GP40KL DP40KL	GP45K DP45K	GP50K DP50K
A	Maximum lift		3300 (130)			
B	Free lift		150 (5.9)			160 (6.5)
C	Fork spread (outside)		300 to 1190 (12 to 47)			
D	Fork length		1220 (48)			
E	Tilt angle (forward – backward)		6° – 10°			
F	Overall length		4290 (168.9)	4340 (170.9)	4395 (173.0)	4525 (178.2)
G	Overall width (outside of tires)	Single tire	1415 (55.7)	1460 (57.5)		
		Dual tire	1780 (70.1)			1965 (77.4)
H	Overall height (to top of mast lowered)		2320 (91.5)		2400 (94.5)	
I	Overall height (to top of overhead guard)		2250 (88.6)			
J	Overall height (mast extended)		4570 (180)			4590 (180.5)
K	Tread (front)	Single tire	1175 (46.5)			
		Dual tire	1445 (56.9)			
L	Tread (rear)		1180 (46.5)			
M	Wheelbase		2000 (78.5)			2150 (84.5)
N	Front overhang		557 (21.9)		562 (22.1)	582 (22.9)
O	Rear overhang		513 (20.6)	563 (22.6)	613 (24.4)	573 (22.6)
P	Underclearance (at frame)		252 (9.9)			

Technical Data

Item \ Truck Model			GP40K DP40K	GP40KL DP40KL	GP45K DP45K	GP50K DP50K
Model code			GP: ET29C DP: ET19C			GP: ET33B DP: ET28B
Type			Standard			
General	Capacity/load center kgf/mm (lbf/in.)		4000/500 (8000/24)	4000/600 (9000/24)	4500/600 (10000/24)	5000/600 (11000/24)
	Maximum lift mm (in.)		3300 (130)			
	Lift speed (rate load) mm/sec (fpm)		GP: 510 (100) DP: 520 (103)		GP: 440 (87) DP: 450 (89)	
	Lowering speed (rate load) mm/sec (fpm)		500 (100)			
	Tilt angle (forward – backward)		6° – 10°			
	Free lift mm (in.)		150 (5.9)			160 (6.5)
Performance	Travel speed of powershift transmission models km/h (mph)	Forward	19.5 (12)			23.5 (14.6)
		Reverse	19.5 (12)			23.5 (14.6)
	Minimum turning radius mm (in.)		2735 (107.5)	2775 (109.5)	2820 (111)	2965 (116.5)
	Steering angle	Inside	83°			
		Outside	56°33’			
	Minimum intersecting aisle mm (in.)	Single tire	2390 (94)	2430 (96)	2450 (96.5)	2510 (99)
		Dual tire	2570 (101)	2590 (102)	2620 (103)	2670 (105)
Tires	Front tires (size and inflation pressure) kPa (kgf/cm^2) [psi]	Single tire	8.25-15-14PR (I) 785 (8.0) [114]			
		Dual tire	7.50-16-12PR (I) 800 (8.2) [116]			8.25-15-12PR (I) 800 (8.2) [116]
	Rear tires (size and inflation pressure) kPa (kgf/cm^2) [psi]		7.00-12-12PR (I) 700 (7.0) [100]		7.00-12-12PR (I) 850 (8.5) [120]	
Truck weight	Single drive tire (unloaded) kg (lb)		GP: 5570 (12300) DP: 5710 (12600)	GP: 5970 (13150) DP: 6120 (13500)	GP: 6530 (14400) DP: 6680 (14750)	GP: 7050 (15500) DP: 7160 (15800)
	Dual drive tire (unloaded) kg (lb)		GP: 5700 (12550) DP: 5900 (13000)	GP: 6050 (13350) DP: 6250 (13750)	GP: 6610 (14550) DP: 6820 (15050)	GP: 7130 (15700) DP: 7320 (16150)

Item \ Truck Model		GP40K	GP40KL	GP45K	GP50K
Engine (gasoline and LP-gas)	Engine model	TB45			
	Type	Gasoline			
	Cooling system	Water cooled			
	No. of cylinders – arrangement	6 – in-line			
	No. of strokes	4			
	Type of combustion chamber	Semi -spherical			
	Valve arrangement	Overhead			
	Type of cylinder liners	Integral			
	Cylinder bore × stroke mm (in.)	99.5 × 96.0 (3.92 × 3.78)			
	Displacement cc (cu in.)	4500 (275)			
	Compression ratio	9.2 : 1			
	Rated output kW/rpm	72/2450			
	Rated torque N·m (kgf·m) [lbf·ft]/rpm	280 (28.5) [207]/1200			
	Minimum engine speed rpm	650 to 700			
	Maximum engine speed rpm	2450			
	Dimensions (L × W × H) mm (in.)	907 × 647.5 × 781 (35.7 × 25.5 × 30.7)			
	Weight kg (lb)	290 (639)			
	Installation position	Rear			
	Ignition	Spark			
	Firing order	1 – 5 – 3 – 6 – 2 – 4			
	Initial ignition timing BTDC deg	10 ± 1			
	Fuel tank capacity liter (U.S. gal.)	115 (30)			

Item \ Truck Model				GP40K	GP40KL	GP45K	GP50K
Ignition system	Ignition coil type			Mold			
	Distributor	Type		Pointless			
		Type of spark advance control		Internal solid state circuit			
	Spark plug	Model		BPR4ES			
		Size	mm (in.)	–			
		Gap	mm (in.)	0.8 to 0.9 (0.031 to 0.035)			
Fuel system	Fuel pump type			Electromagnetic			
Air cleaner	Type × Number			Cyclone with paper element × 1			
Engine lubrication system	Type			Pressure feed			
	Oil pump			Gear pump			
	Oil filter			Paper element			
	Oil cooler			Oil to water type			
	Refill capacities	Oil pan liter (U.S. gal)		7.3 (1.93)			
		Oil filter & cooler liter (U.S. gal)		0.3 (0.08)			
		Total liter (U.S. gal)		7.6 (2.01)			
Cooling system	Type			Forced circulation			
	Radiator			Corrugated fin with pressure type			
	Refill capacity liter (U.S. gal.)			11.2 (2.96)			
	Water pump			Centrifugal type driven by V-belt			
	Thermostat			Wax type			

Item \ Truck Model		GP40K	GP40KL	GP45K	GP50K
Battery	Type × number	55D26R			
	Voltage V	12			
	Capacity AH (5 Hr)	50			
Alternator	Type	3-phase AC			
	Rated output V – A	12 – 50			
	Regulator	Built-in IC type			
Starter	Type	Electromagnetic			
	Voltage – output V – kW	12 – 0.75			

Item \ Truck Model			DP40K	DP40KL	DP45K	DP50K
Engine (diesel)	Engine model		S6S			
	Type		Water-cooled, 4-stroke cycle			
	No. of cylinders – arrangement		6 – in-line			
	Type of combustion chambers		Swirl			
	Valve arrangement		Overhead			
	Type of cylinder liners		Dry			
	Bore × stroke mm (in.)		94 × 120 (3.70 × 4.72)			
	Displacement cc (cu in.)		4996 (305)			
	Compression ratio		22 : 1			
	Rated output kW/rpm		62.5/2450			
	Maximum torque N·m (kgf·m) [lbf·ft]/rpm		250 (25.5) [184]/1600			
	Dimensions (L × W × H) mm (in.)		907.5 × 639 × 801 (35.7 × 25.2 × 31.5)			
	Weight (service) kg (lb)		350 (771)			
	Installation position		Rear			
	Intake valves	Open BTDC deg	30°			
		Close ABDC deg	50°			
	Exhaust valves	Open BBDC deg	74°			
		Close ATDC deg	30°			
	Valve clearance (at cold)	Intake valves mm (in.)	0.25 (0.0098)			
		Exhaust valves mm (in.)				
	Ignition		Compression			
	Firing order		1 – 5 – 3 – 6 – 2 – 4			
	Ignition or injection timing BTDC deg		19°			

Item \ Truck Model			DP40K	DP40KL	DP45K	DP50K
Engine (diesel)	Fuel tank capacity liter (U.S. gal.)		115 (30)			
	No-load minimum speed rpm		650 to 700			
	No-load maximum speed rpm		2600 to 2650			
Fuel system	Fuel injection pump	Type	Bosch			
		Plunger diam. mm (in.)	6.5 (0.256)			
		Cam lift (one side) mm (in.)	6 (0.24)			
	Fuel injection nozzles	Type	Throttle			
		Spray holes diam. mm (in.)	1.0 (0.04)			
		Injection pressure kPa (kg/cm^2) [psi]	1372 (140) [1992]			
	Glow plugs	Type	Sheathed			
		Voltage – current V – A	22 – 4.4			
	Fuel pump type		Plunger			
	Air cleaner	Type × number	Cyclone with paper element × 1			
Lubrication system	Type		Pressure feed			
	Oil pump		Trochoid type			
	Oil filter		Paper element type			
	Refill capacities liter (U.S. gal.)	Oil pan	11 (2.9)			
		Oil filter	1 (0.3)			
		Total	12 (3.2)			

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Item \ Truck Model			DP40K	DP40KL	DP45K	DP50K
Cooling system	Type		Forced circulation			
	Radiator		Corrugated fin with pressure cap			
	Refill capacity liter (U.S. gal.)		10.35 (2.7)			
	Water pump		Centrifugal type driven by V-belt			
	Thermostat		Wax type			
Battery	Type × number		48D26R × 2			
	Voltage V		24			
	Capacity Ah		50			
Alternator and regulator	Alternator type		3-phase AC			
	Capacity V – A		24 – 35			
	Voltage/current regulator		Built-in IC type			
Starter	Type		Electromagnetic			
	Voltage – output V – kW		24 – 5			
Engine stop device	Control timer	Setting sec	5 to 7			
	Stop solenoid	Operating voltage V	16 to 30			
		Rated current (at 24 V) V	11.3			
	Detector (magnetic pickup)	Output mA				180 minimum
		Gap mm (in.)				0.7 ± 0.2 (0.028 ± 0.008)

Item \ Truck Model				GP40K DP40K	GP40KL DP40KL	GP45K DP45K	GP50K DP50K
Power train	Clutch (DP40K thru DP45K)	Type		Dry, single disc (OP: wet type)			
		Facing (OD × ID), mm (in.)		325 × 210 (12.8 × 8.3) [wet: 325 × 225 (12.8 × 8.9)]			
		Material		DR-8 (wet: cork)			
	Torque converter	Type		3-element, 1-stage, 2-phase			
		Model		M15			
		Stall torque ratio		3.2			
	Powershift transmission	Control and shift		Hydraulic and column shift			
		Ratios	Forward	4.044			F1: 5.735 F2: 3.239
			Reverse	4.057			R1: 5.735 R2: 3.239
	Manual transmission (DP40K thru DP45K)	Type		Synchro-mesh			
		Shift		Floor-shift			
		Forward ratio	1st	8.462			
			2nd	4.145			
		Reverse ratio	1st	8.489			
			2nd	4.159			
	Reduction gear	Type of gear		Spiral bevel			
		Gear ratio		4.857			
	Differential	Housing		Banjo			
		Type of gear – number		Straight bevel – 2			
		Type of pinion – number		Straight bevel – 4			

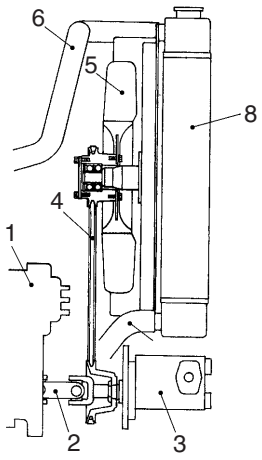
Item \ Truck Model				GP40K DP40K	GP40KL DP40KL	GP45K DP45K	GP50K DP50K
Steering system	Type			Recirculating ball-and-nut			
	Gear ratio			20.0			
	Steering wheel diameter mm (in.)			380 (15)			
	Power steering	Type		Semi-integral			
		Power cylinder ID × rod diam. mm (in.)		55 × 25 (2.17 × 0.98)			
		Effective stroke mm (in.)		275 (10.8)			
		Relief pressure kPa (kgf/cm²) [psi]		8336 $^{+490}_{0}$ (85 $^{+5}_{0}$) [1209 $^{+71}_{0}$]			
		Flow rate liter (U.S. gal)/min		17.5 ± 0.5 (4.6 ± 0.13)			
Traveling system	Front axle			Full-floating tubular type			
	Rear axle			Elliott type			
	Suspension system	Front		Fixed type			
		Rear		Center-pivot type			
	Wheel alignment	Toe-in mm (in.)		0			
		Camber		1.0°			
		Caster		0°			
		Kingpin inclination		5.0°			
Brake system	Wheel brakes	Type		Self-adjusting, duo-servo			
		Drum diameter mm (in.)		317.5 (12.50)			
		Lining (length × width × thickness – number) mm (in.)		351 × 60 × 6 – 2 (13.8 × 2.4 × 0.2 – 2)			332 × 63 × 10 – 2 (13.1 × 2.5 × 0.4 – 2)
		Master cylinder ID mm (in.)		22.22 (0.8748)			25.4 (1.000)
		Wheel cylinder ID mm (in.)		28.58 (1.1252)			31.75 (1.2500)
	Parking brake	Type		Mechanical, mounted on wheels			
Brake booster				Mastervac (vacuum suspended)			
Body				Assembled-frame type			

Item \ Truck Model			GP40K DP40K	GP40KL DP40KL	GP45K DP45K	GP50K DP50K
Hydraulic system	Hydraulic pump	Type	Gear			
		Rated discharge liter (U.S. gal)/rpm	110 (29.0)/2450			
		Drive line	Universal joint			
	Control valve	Type	KVS-120VPF-2			
		Relief pressure MPa (kgf/cm^2) [psi]	19.1 (195) [2773]			
	Flow regulator valve	Type	Variable (Adjustable)			
		Regulated flow rate liter (U.S. gal)/min	100 (26.4)		115 (30.4)	
	Lift cylinders	ID mm (in.)	$65\ ^{+0.1}_{0}$ ($2.56\ ^{+0.004}_{0}$)		$70\ ^{+0.1}_{0}$ ($2.76\ ^{+0.004}_{0}$)	
		Stroke mm (in.)	1500 (59.06)			
	Tilt cylinders	ID mm (in.)	$80\ ^{+0.1}_{0}$ ($3.15\ ^{+0.004}_{0}$)		$90\ ^{+0.1}_{0}$ ($3.54\ ^{+0.004}_{0}$)	
		Stroke mm (in.)	185 (7.28)			
	Hydraulic tank capacity liter (U.S. gal)		L: 56.5 (14.9) N: 58.7 (15.5) H: 64.4 (17.0)			

COOLING SYSTEM

Structure ..... 2 – 1
Removal and Installation ..... 2 – 2
Inspection and Adjustment ..... 2 – 5
Fan Belt Condition ..... 2 – 5
Fan Belt Tension ..... 2 – 5
Connecting Radiator Hoses ..... 2 – 5
Coolant ..... 2 – 6
Radiator Cap ..... 2 – 6

Structure



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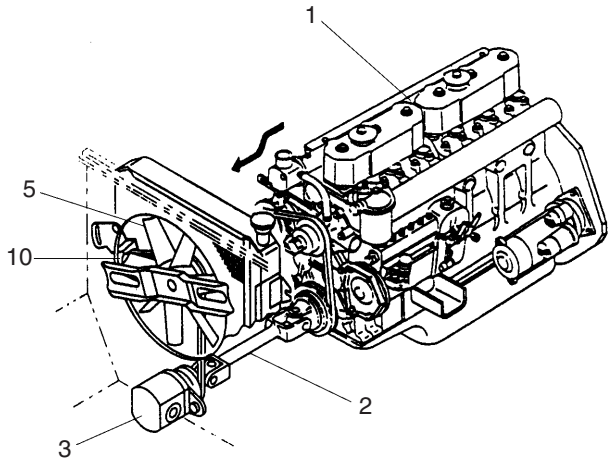

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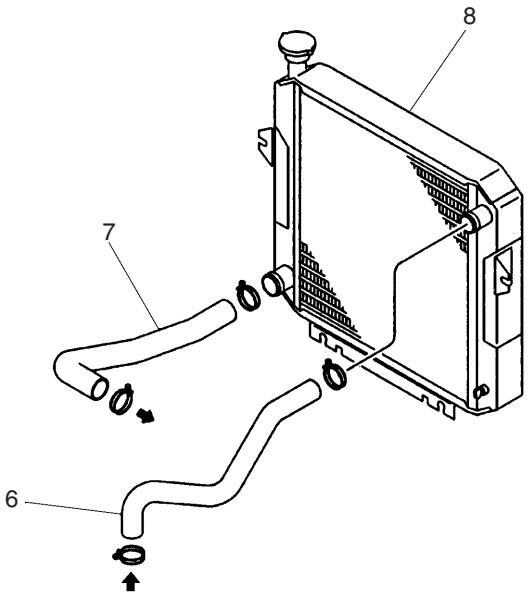

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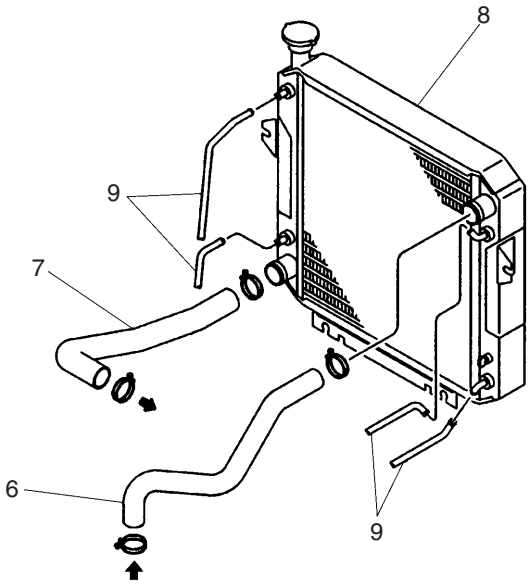
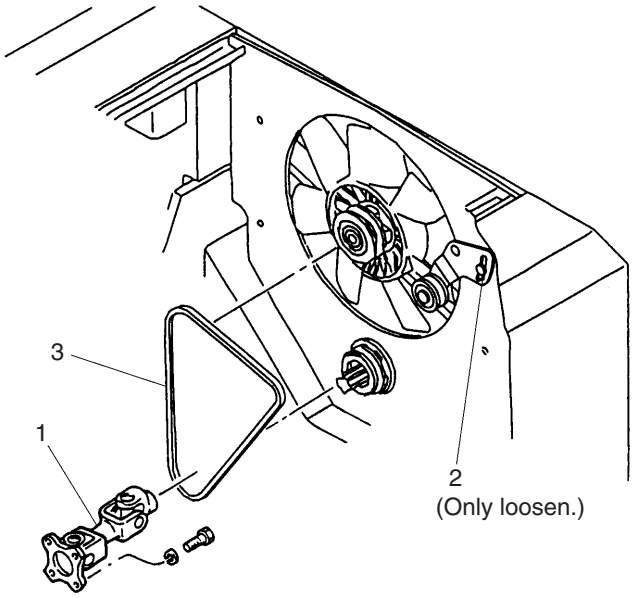


208413

1 Engine
2 Universal joint
3 Gear pump
4 Fan belt
5 Cooling fan
6 Upper hose
7 Lower hose
8 Radiator
9 Oil cooler hoses
10 Tension pulley

Removal and Installation

Fan Belt Removal



208414

Sequence

1 Universal joint
2 Tension pulley assembly, Bolt
3 Fan belt

Start by:

Remove the radiator cover.

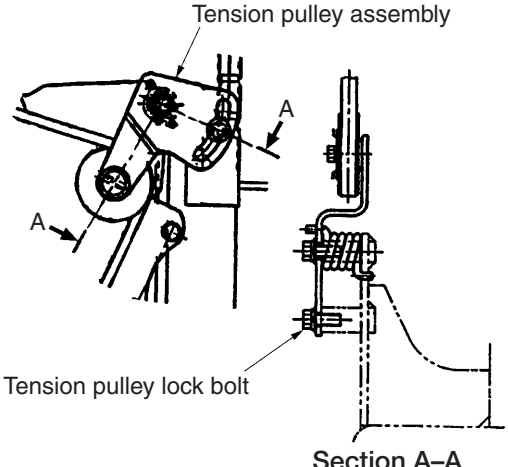
Suggestion for removal

(1) Using a ratcheting wrench inserted in the gap between the weight and frame, loosen the tension pulley lock bolt by three or four turns. If the bolt is loosened insufficiently, the tension pulley will not move.

NOTE

Do not loosen the lock bolt to such an extent that the tension pulley would be removed.

(2) Move the tension pulley fully toward the fan, then remove the belt.



208415

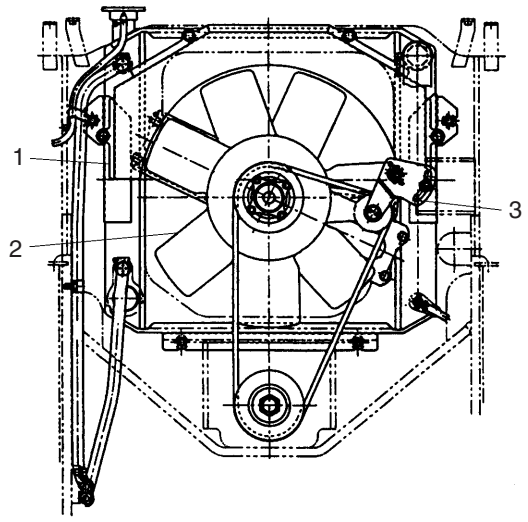
Installation

Perform installation by following the removal sequence in reverse. Also follow the instructions given below.

(1) Before installing the belt, turn the fan to check for smooth rotation. Replace the bearing if it generates abnormal sound.

(2) After installing the belt, push it at a point midway between the driven and drive pulleys to make sure that the tension pulley moves, then tighten the pulley lock bolt firmly.

Fan Assembly Removal



208416

Sequence

1 Fan cover
2 Fan assembly
3 Tension pulley assembly

Start by:

Remove the radiator cover.

Suggestion for removal

Remove the fan support bolts, detach the belt from the driven pulley, and then remove the fan assembly. Place the fan assembly with the fan support facing down and turn the fan to check for smooth rotation. Replace the bearing if it generates abnormal sound.

Installation

Perform installation by following the removal sequence in reverse. Also follow the instruction given below.

(1) With the tension pulley lock bolt loosened, attach the belt to the driven pulley (fan assembly pulley), then screw in the bolt at the bottom of the fan support; do not tighten the bolt yet. Holding the fan support by its top, move the support until it reaches the boss (frame), then tighten all the fan support bolts.

(2) Adjust the tension of the fan belt.

Inspection and Adjustment

Fan Belt Condition

(1) Check the belt for contamination with oil, grease and/or dust. When the contamination is slight, clean the belt with a rag or paper towel. Do not use gasoline, oil or any other solvent to clean the belt.

(2) During engine overhaul or belt tension adjustment, closely check the condition of the belt. Replace the belt with a new one if it has any sort of damage.

Fan Belt Tension

Apply a force of 98 N (10 kgf) [22 lbf] perpendicularly to the belt at a point midway between the fan pulley and tension pulley. If necessary, adjust the tension by moving the tension pulley assembly such that the belt deflects 16 mm (0.63 in) when pressed with the above force. After adjustment, tighten the tension pulley assembly lock bolt firmly.

Connecting Radiator Hoses

When connecting the hoses to the radiator, fit their ends fully on the fittings and secure them with clamps. Tighten the clamp bolts to the torques indicated below. Make sure that each hose is correctly retained and prevented from disconnection by the flare of the fitting.

Clamp bolt tightening torques

Upper and lower hoses	3.92 to 5.88 N·m (0.4 to 0.59 kgf·cm) [2.9 to 4.3 lbf·ft]
Cooler hose	2.94 to 4.9 N (0.3 to 0.5 kgf) [2.2 to 3.6 lbf]

Coolant

Fill the radiator with coolant containing antifreeze. Start and operate the engine to let it warm up while checking for abnormal noise. Make sure that the quantity of coolant is as specified by checking the level in the reserve tank.

Quantity of coolant

Unit: liter (U.S. gal.)

Item \ Truck Model	GP40K, GP40KL, GP45K, GP50K	DP40K, DP40KL, DP45K, DP50K
Engine	11.2 (2.96)	7.1 (1.9)
Radiator	3.4 (0.9)	4.7 (1.2)
Reserve tank (FULL level)	0.65 (0.17)	0.65 (0.17)
Total quantity of coolant (including coolant in hoses)	15.3 (4.04)	14.7 (3.9)
Oil cooler	0.62 (0.16)	0.31 (0.08)

Radiator Cap

Opening pressure	90 ± 15 kPa (0.92 ± 0.15 kgf/cm^2) [13.1 ± 2.2 psi]
Vacuum valve	0 to 5 kPa (0 to 0.05 kgf/cm^2) [0 to 0.73 psi]

ELECTRICAL SYSTEM

Structure and Functions ..... 3 – 1
- Console Box ..... 3 – 1
- Electrical Components Mounted on Body ..... 3 – 4

Disassembly and Reassembly ..... 3 – 5
- Console Box ..... 3 – 5
- Components in Console Box ..... 3 – 7
- Combination Meter ..... 3 – 8

Major Electrical Components ..... 3 – 9
- Starter Switch (with Anti-Restart Lock) ..... 3 – 9
- Lighting Switch ..... 3 – 10
- Turn Signal Switch ..... 3 – 10
- Fuel Tank Unit ..... 3 – 11
- Fuse Box ..... 3 – 12
- Spare Terminals ..... 3 – 12

Lamp Bulb Specifications ..... 3 – 13

Battery Maintenance ..... 3 – 14

FC (Finger-Tip-Control System) ..... 3 – 16
- Nomenclature ..... 3 – 16
- Maintenance Precautions ..... 3 – 17
- Description ..... 3 – 18
- Operating Principles ..... 3 – 19
- How to Set Controller ..... 3 – 27

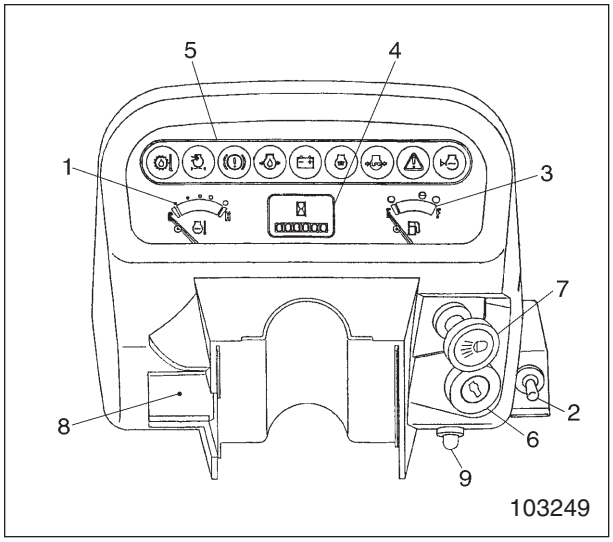
Troubleshooting ..... 3 – 30
- Starter System ..... 3 – 30
- Gauges ..... 3 – 30
- Lighting System ..... 3 – 31
- Alarm Unit ..... 3 – 31
- Battery ..... 3 – 32

FC (Finger-Tip-Control System) ..... 3 – 33
1. Preparatory steps ..... 3 – 33
2. Connecting the GSE to the controller ..... 3 – 35
3. Troubleshooting cases as examples ..... 3 – 36
4. How to move the mast in an emergency ..... 3 – 48
5. How to clean harness connectors and system components ..... 3 – 52
6. Troubleshooting guide for solenoid control valves ..... 3 – 53
7. Troubles Conceivable for Each Component ..... 3 – 53
Electrical Schematics ..... 3 – 55

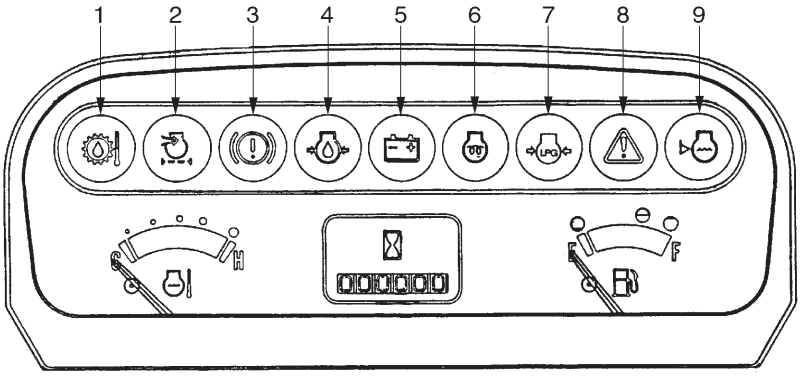
Structure and Functions

Console Box

1 Engine coolant temperature gauge
2 Travel speed select switch
3 Fuel gauge (for diesel-engine models)
4 Service hourmeter
5 OK monitor
6 Starter switch
7 Lighting switch
8 Fuse box
9 Auto-light switch (for FC models)



OK Monitor



103239

Function

No.	Indicator light	OFF	ON or flickering	Remarks
1	Powershift transmission oil temp. indicator light	Normal	Overheating	
2	Air cleaner element indicator light	Normal	Clogged	Option
3	Brake fluid level indicator light	Normal	Low	
4	Engine oil pressure indicator light	Normal	Low	
5	Alternator not charging indicator light	Normal	Abnormal	
6	Heater plug indicator	Normal		Diesel-engine models
7	LP-Gas residual pressure alarm lamp	Normal	Drain water	Option
8	System indicator light	Normal	Abnormal	FC models
9	Engine coolant level indicator light	Normal	Low	Option

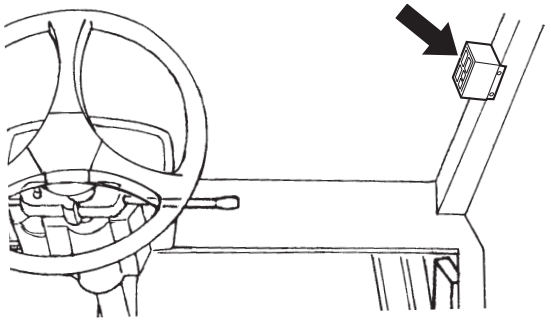
How to check indicator light bulbs

The bulbs are normal if all the indicator lights come ON when the starter switch key is turned to the | (ON) position. (The indicator lights will go OFF when the engine starts.)

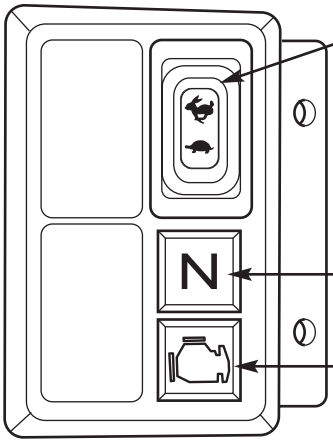
Truck Model	Indicator light No.
MC diesel-engine model	1, 2, 3, 4, 5, 6
MC LPG-engine model	1, 2, 3, 4, 5
FC diesel-engine model	1, 2, 3, 4, 5, 6, 8
FC LPG-engine model	1, 3, 4, 5, 8

Sub Panel

The sub panel is mounted at the right front pillar of the head guard.

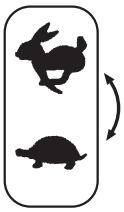


104794



104789

1st speed mode/automatic mode selector switch (For 5 Ton Model as standard and others as optional)



Automatic mode
(1st speed ⟷ 2nd speed)

1st speed mode

Select the 1st speed mode for operating in the speed-limit area [14 km/h (8.7 mph) max.], climbing or traction.

104575

Driving interlock indicator lamp

Flickers if the operator leaves the seat with the direction lever in the forward or reverse position while the engine is running.

Neutral indicator lamp

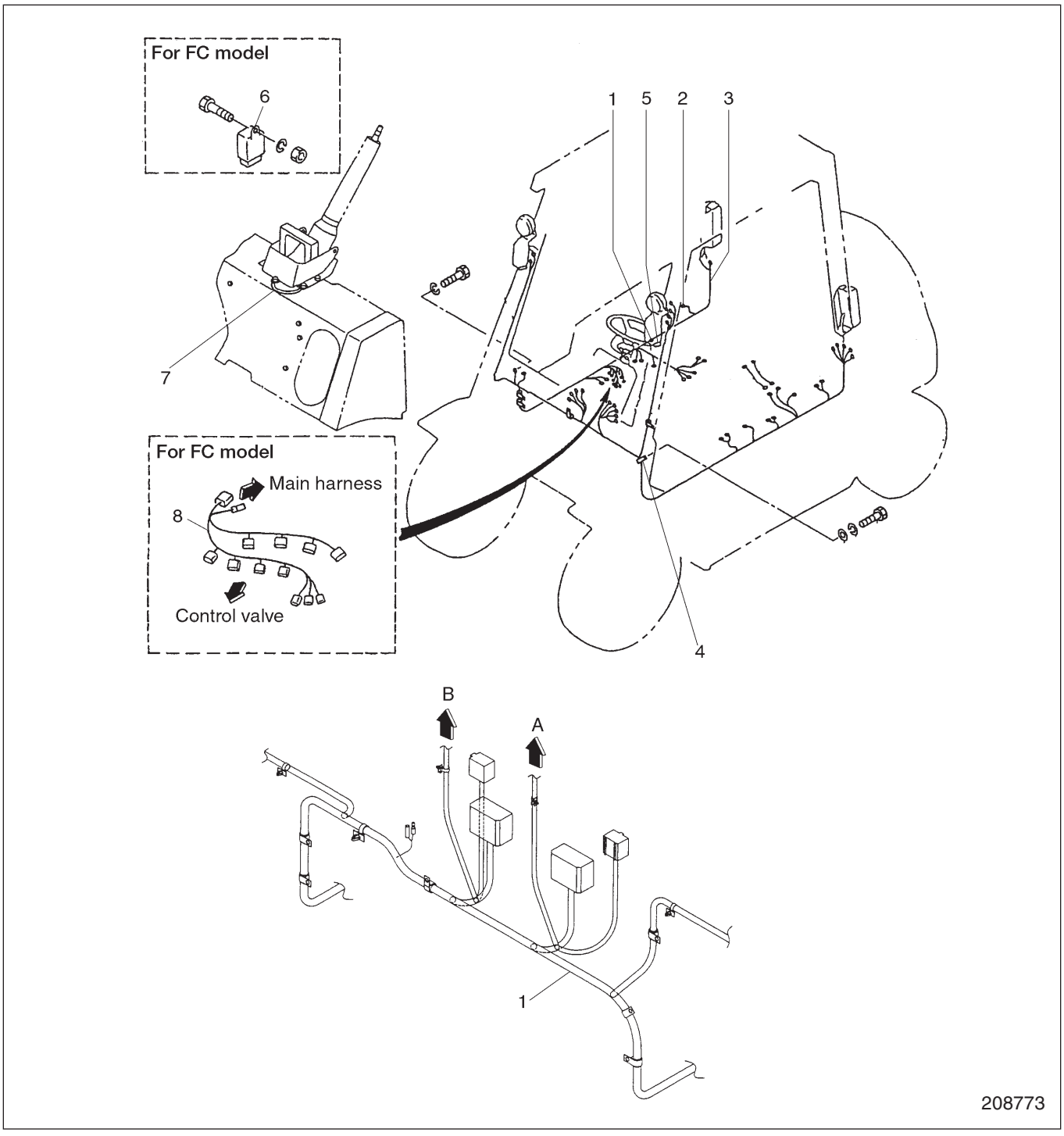
Glows when the direction lever is placed in Neutral (N) position.

ECM warning light (GASOLINE)
(IF EQUIPPED)

Glow when ECM (engine control module) is abnormal.

Consult your Cat lift truck dealer.

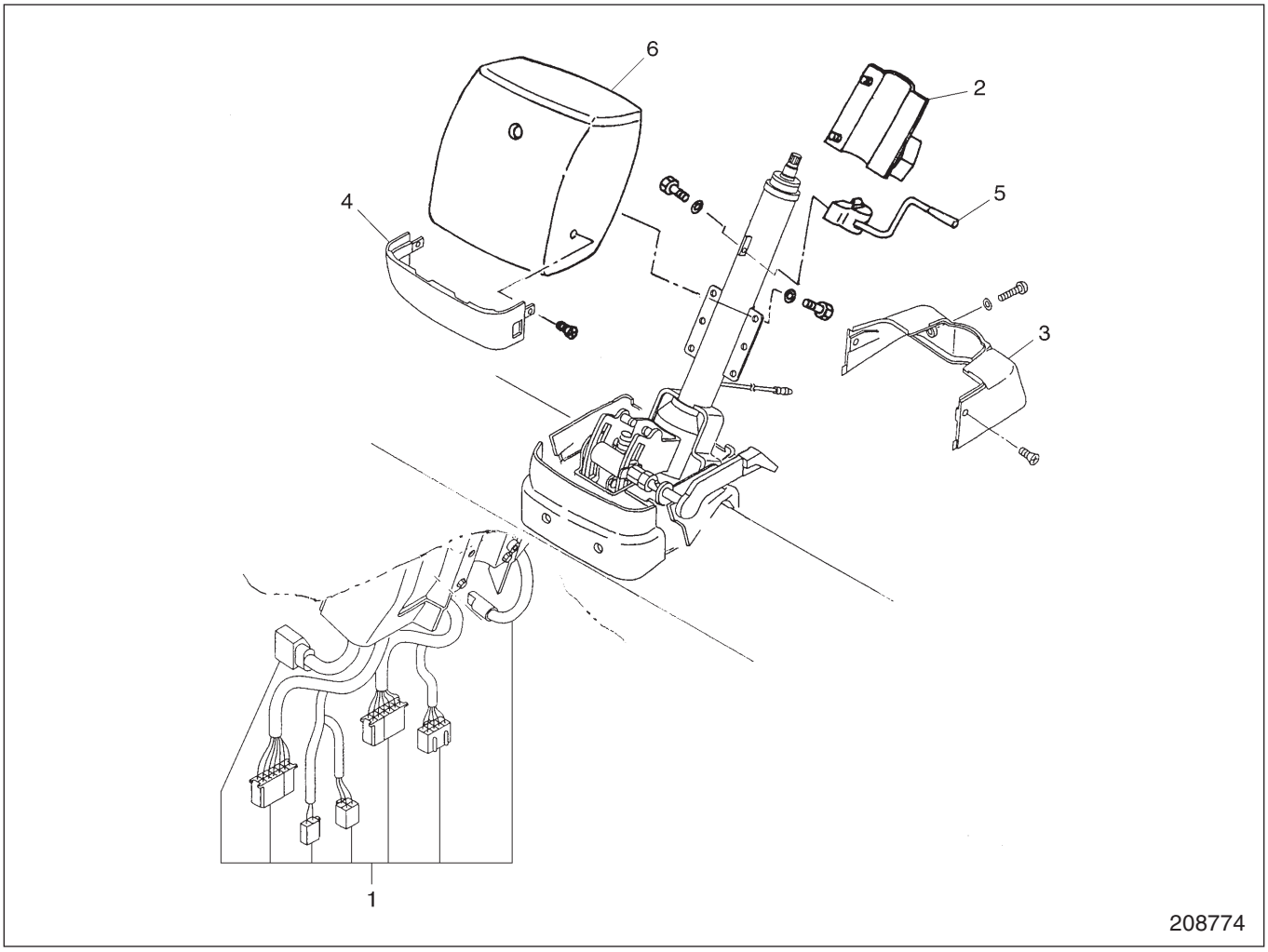
Electrical Components Mounted on Body



1 Main harness
2 Fusible link (R.H.)
3 Fusible link (L.H.)
4 Fuse
5 Fuse
6 Power relay (FC model)
7 System harness
8 Harness (tilt earth)
A: To forward/reverse lever
B: To turn signal switch

Disassembly and Reassembly

Console Box



Disassembly

1. Disconnect the electrical wires at connectors 1.
   (Disconnect the choke cable on the engine side.)
2. Remove four screws 2 securing the cover.
3. Remove six screws 3 and separate the front and rear panels.
4. Remove four screws 4 securing the instrument panel.

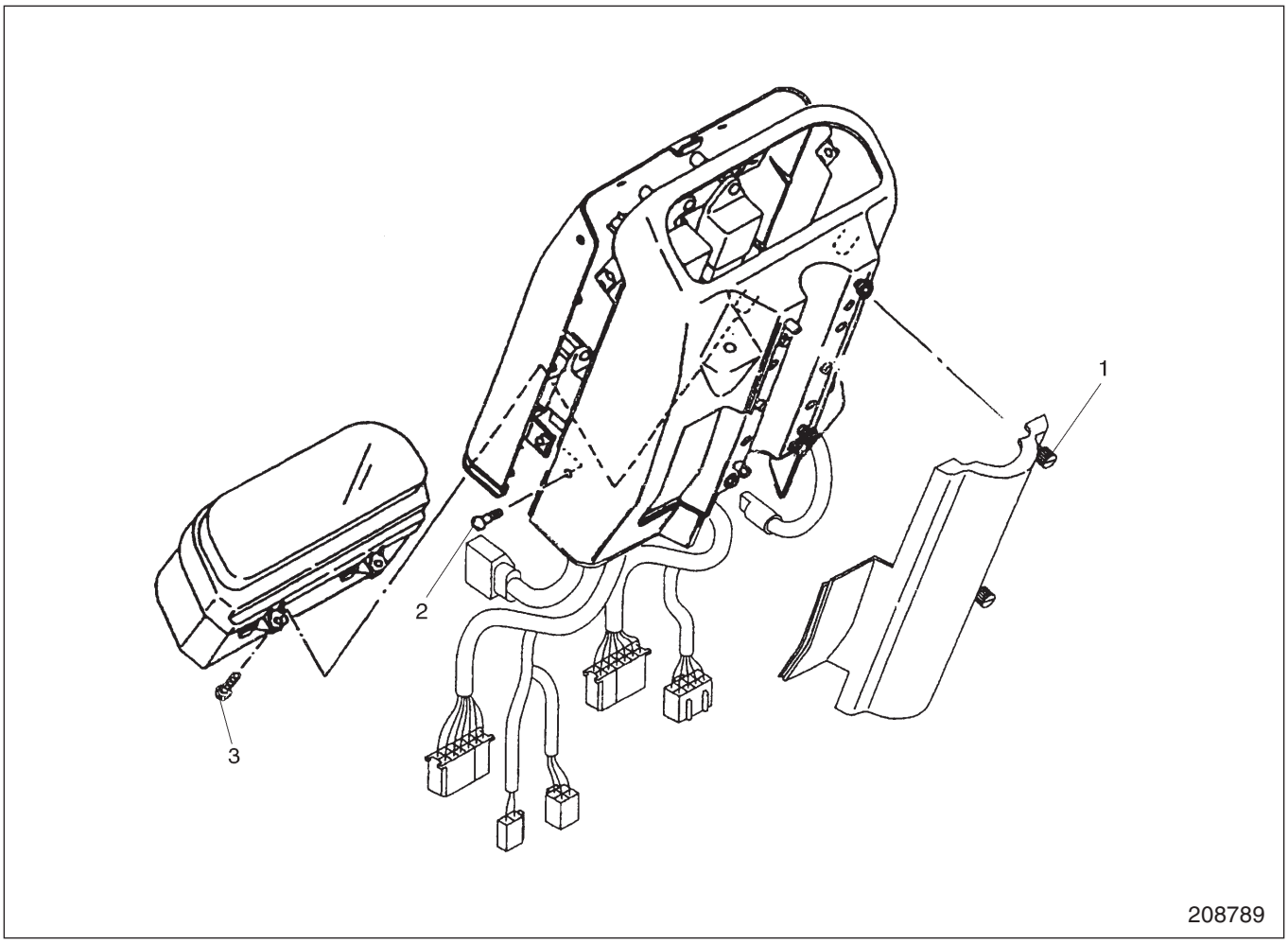
NOTE

To replace the instrument panel bulbs, remove screws 3 and 4.

Reassembly

To reassemble the console box, follow the reverse of disassembly procedure.

Console Box



Disassembly

1. Remove two screws 1 securing the cover. (Use a flat-tip screwdriver)
2. Remove six screws 2 and separate the front and rear panels.
3. Remove four screws 3 securing the instrument panel.

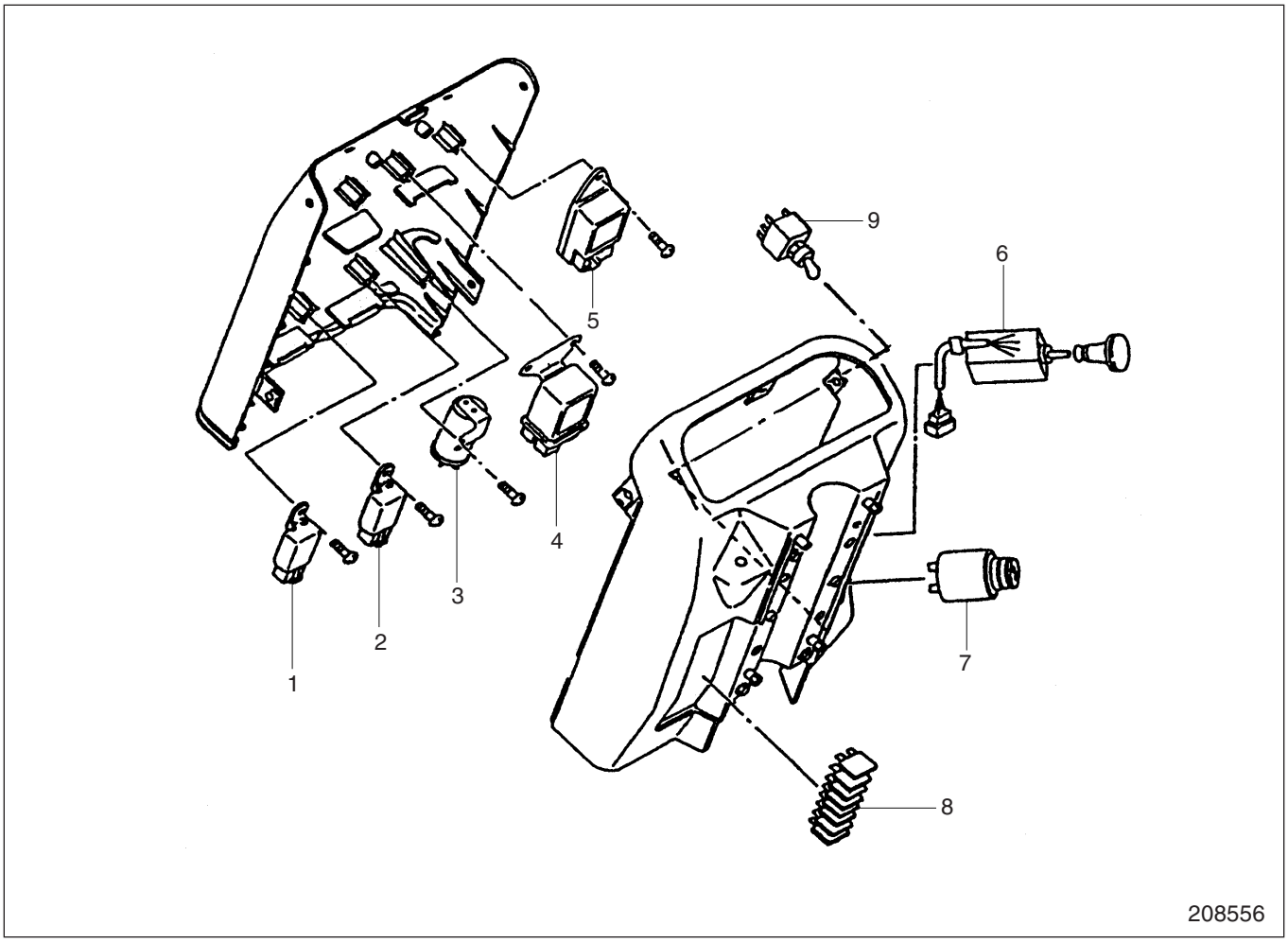
NOTE

To replace the instrument panel bulbs, remove screws 2 and 3.

Reassembly

To reassemble the console box, follow the reverse of disassembly sequence.

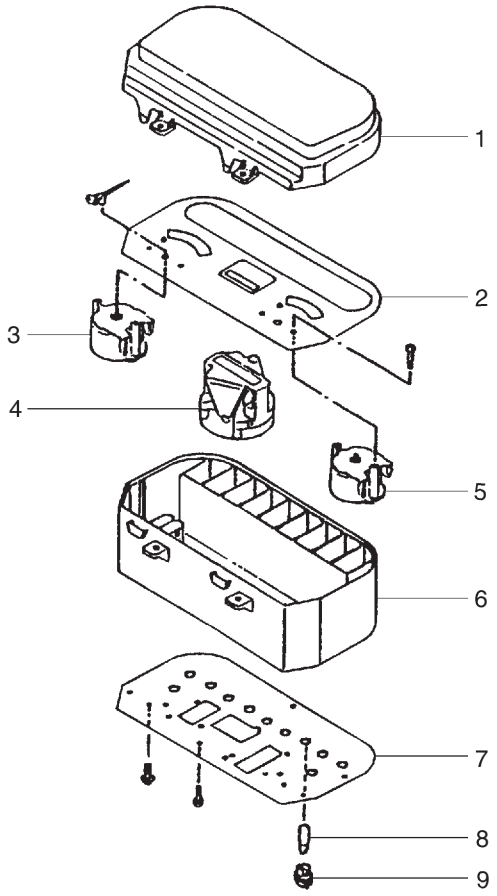
Components in Console Box



1 Power relay
2 Power relay (diesel-engine models)
3 Turn signal relay
4 Glow plug relay (diesel-engine models)
5 Glow plug timer (diesel-engine models)
6 Lighting switch
7 Starter switch
8 Fuses
9 Travel speed select switch

Combination Meter

Disassembly



206480

Sequence

1 Instrument panel
2 Dial
3 Engine coolant temperature gauge
4 Service hourmeter
5 Fuel gauge (diesel-engine models)
6 Meter case
7 Printed circuit plate
8 Bulb
9 Socket

⚠ CAUTION

Be careful not to damage the printed circuit plate when disassembling the combination meter.

Reassembly

To reassemble the combination meter, follow the reverse of disassembly sequence.

Bulb replacement

For bulb replacement, remove the socket from the printed circuit plate by turning it to the left. For configuration of the indicator lights, refer to the preceding section “OK Monitor”.